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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,316	10/21/2003	Sota Shinohara	NEC 19851 DIV	4523
27667	7590	07/26/2004	EXAMINER	
HAYES, SOLOWAY P.C. 130 W. CUSHING STREET TUCSON, AZ 85701			LE, THAO P	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,316

Applicant(s)

SHINOHARA ET AL.

Examiner

Thao P. Le

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/21/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Preliminary Amendment

Preliminary Amendment filed on 10/21/03 has been entered *and made of record*.

In Preliminary Amendment, applicant cancels claims 1-14 and 26, claims 15-25 are remained for examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15-17, 20 are rejected under 35 USC 102 (e) as being anticipated by Yamazaki et al., U.S. Patent No. 6,046,469.

Regarding to claims 15 and 20, Yamazaki et al. discloses a method of forming a memory comprising:

- . forming a barrier layer (12/13/14) having a lower surface connected to an upper end of a conducting member 5 having a lower end connected to an underlying layer 7 (Fig. 1);

- . forming a lower electrode 15 on the barrier layer;
- . forming a dielectric film 9 on the lower electrode;
- . forming an upper electrode 16 on the dielectric layer;
- . wherein forming the barrier layer includes the step forming a first metal film 12, a metal nitride film 13, and a second metal film 14 in the named order and second metal is the uppermost layer and the first metal is the lowermost layer of the barrier layer (Fig. 1, lines 25-50, Col. 4).

Regarding to claim 16, Yamazaki et al. discloses the method of claim 15 above and further disclose:

Where conducting member 5 is formed in an interlayer insulator film 7 formed in substrate 1, said upper end of conducting member reaching a surface of the interlayer

insulator film and lower end of the conducting member reaching a underlying conducting layer or a surface of the substrate (see Fig. 1),

Wherein the capacitor is formed by depositing the barrier layer, lower electrode, dielectric, and upper electrode on the insulator film in order to form a laminated film and patterning the laminated film to form capacitor and wherein barrier layer is formed by forming a first metal film on insulator film, forming metal nitride film on the first metal film, and forming a second metal film on the nitride film (see Fig. 1, Cols. 3-5).

Regarding to claim 17, Yamazaki et al. discloses the method claimed in claim 15 above and further discloses wherein the metal nitride is formed of a nitride and a metal element constituting the first or second metal film (TiN, the first metal is Ti, Col. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18-19, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al., U.S. Patent No. 6,046,469.

Regarding to claim 18, Yamazaki et al. fails to disclose the first metal film, metal nitride film, and the second metal film formed by one combination selected from the group consisting of: Ti, TiN, and Ti, or Ti, TaN and Ta etc. However, it is obvious to one having ordinary skill in the art that the barrier layer made of a stack layer comprising metal and metal nitride such as Ti, TiN, and Ti is conventional.

Regarding to claim 19, Yamazaki et al. discloses the first electrode is made of PtRhOx but fails to disclose the first electrode is made of Ru, Ir, Ru oxide, Ir oxide and SrRuOx. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use either PtRhOx, Ru, Ir, Ru oxide, or Ir oxide and SrRuOx as first electrode because these groups of materials have similar characteristics and physical and chemical properties and they would carry out similar function.

Regarding to claim 21, Yamazaki et al. discloses the conductive layer is polysilicon but fails to disclose the conductive layer is mainly W. It would have been obvious that polysilicon or W used as conductive layer in this structure is conventional.

Regarding to claims 22-25, Yamazaki discloses the capacitor dielectric is formed by CVD but fails to disclose the capacitor formed by sputtering or solgel method and the temperature used in depositing capacitor dielectric. It would have been obvious to one having ordinary skill in the art that CVD, sputtering or solgel method are well known in the art to be used to form dielectric material. Sputtering or solgel is conventional technique. It would have been obvious that the selection of such parameters such as **energy, concentration, temperature, time, molar fraction, depth, thickness, etc.,** would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in **energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters** would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmischer* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Thao', with a stylized flourish extending from the end.

Thao P. Le
Examiner
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